

(12) UK Patent Application (19) GB (11) 2 367 283 (13) A

(43) Date of A Publication 03.04.2002

(21) Application No 0023553.1

(22) Date of Filing 26.09.2000

(71) Applicant(s)

Guy Radclyffe

47 Richmond Road, BRIGHTON, East Sussex,
BN2 3RL, United Kingdom

Stephen Capon

Flat 3, 41 Sackville Road, HOVE, East Sussex,
United Kingdom

(72) Inventor(s)

Guy Radclyffe

Stephen Capon

(74) Agent and/or Address for Service

Frank B Dehn & Co

179 Queen Victoria Street, LONDON, EC4V 4EL,
United Kingdom

(51) INT CL⁷

B65F 1/06 , B65D 1/22

(52) UK CL (Edition T)

B8P PK12

A4A AE AEX4 AE10 AE7
U1S S1436

(56) Documents Cited

GB 2307847 A

JP 110116001 A

JP 100203601 A

US 5725310 A

US 5299704 A

US 4402452 A

(58) Field of Search

UK CL (Edition T) A4A AE , B8P PC3B PC3C PC3D
PC3X PK12 PK9

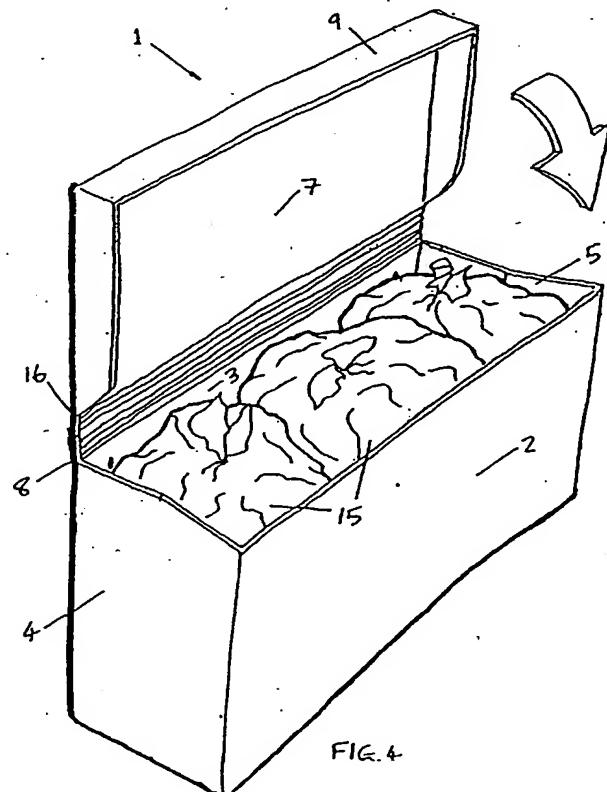
INT CL⁷ B65D 1/22 19/12 19/16 , B65F 1/00 1/06 1/08

ONLINE:WPI,EPODOC,JAPIO

(54) Abstract Title

Collapsible containers

(57) A collapsible container 1, particularly for holding refuse sacks 15, comprises a front panel 2, a rear panel 3, a first side panel 4, a second side panel 5, a base panel 6 and a lid 7. The container has an expanded condition, as shown, with the front panel 2 fully extended away from the rear panel 3. In this condition each of the side panels 4, 5 comprises a generally planar element. The sides panels 4, 5 and base panel 6 are collapsible, say by the provision of hinge lines on these panels, to allow the front panel 2 to be moved close to the rear panel 3 and allow the lid 7 to fold over and cover the front panel 2. The rear panel 3 is preferably fixed to a secure structure, such as a wall or fence, to prevent unwanted movement of the container 1 and to hold the container 1 upright when not in use and in its collapsed condition.



GB 2 367 283 A

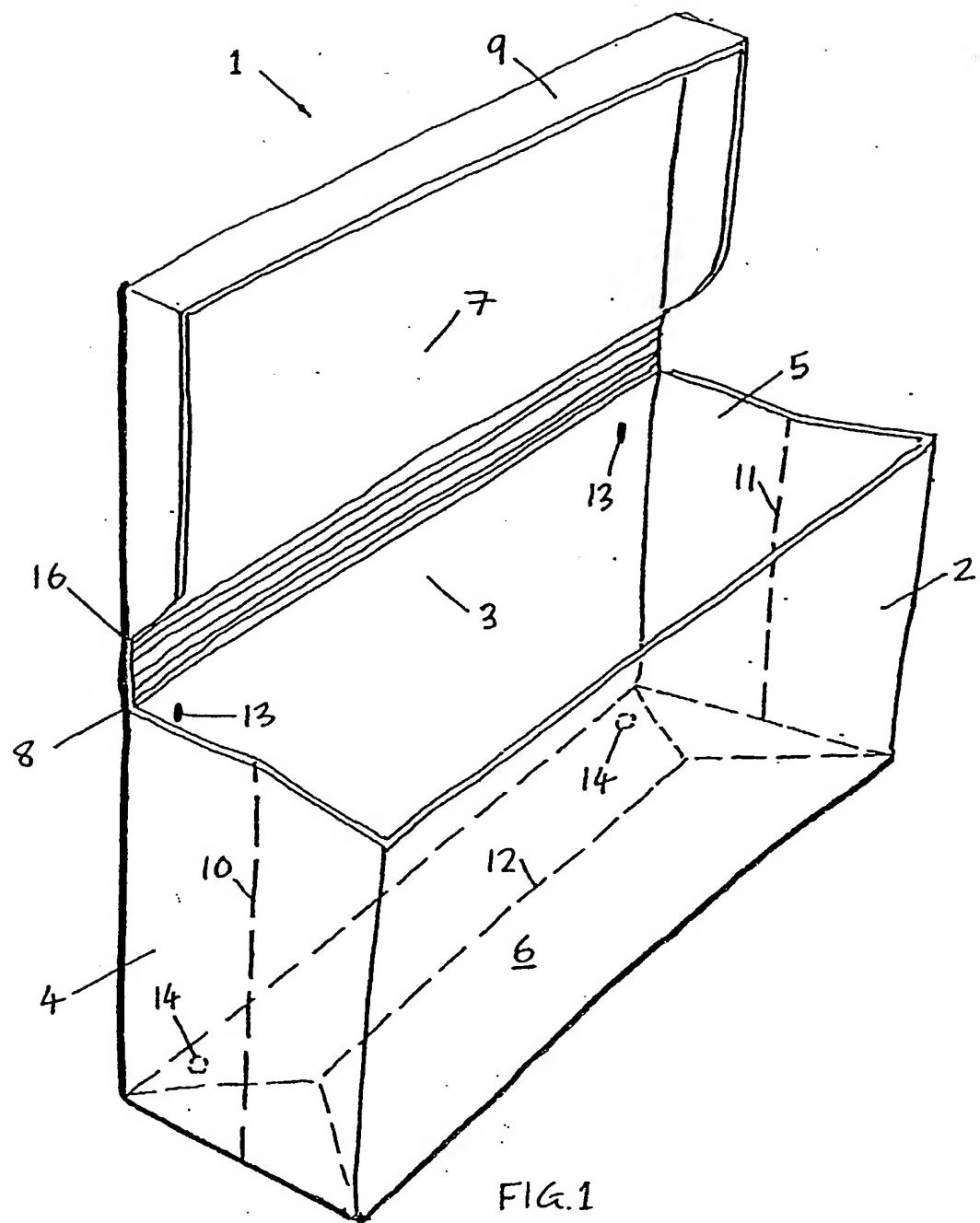


FIG. 1

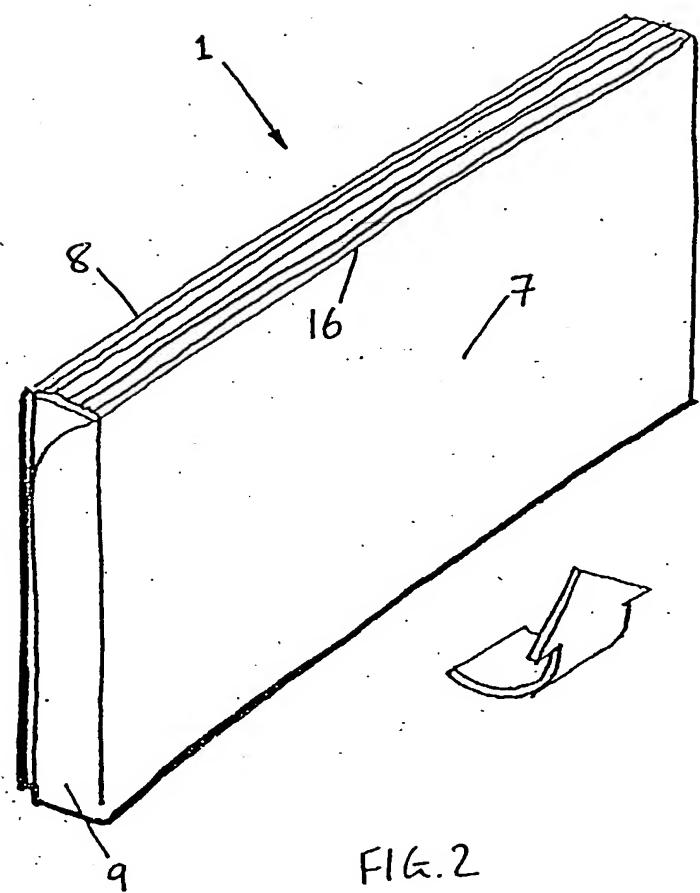
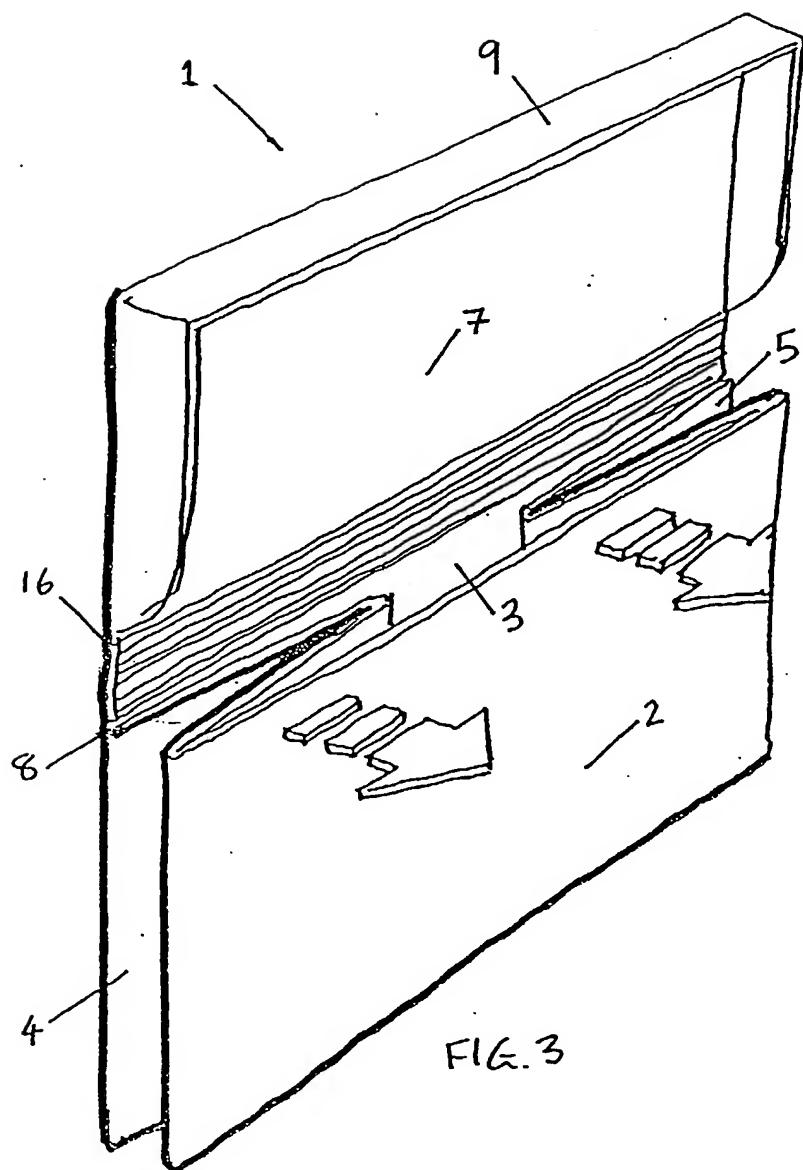


FIG. 2



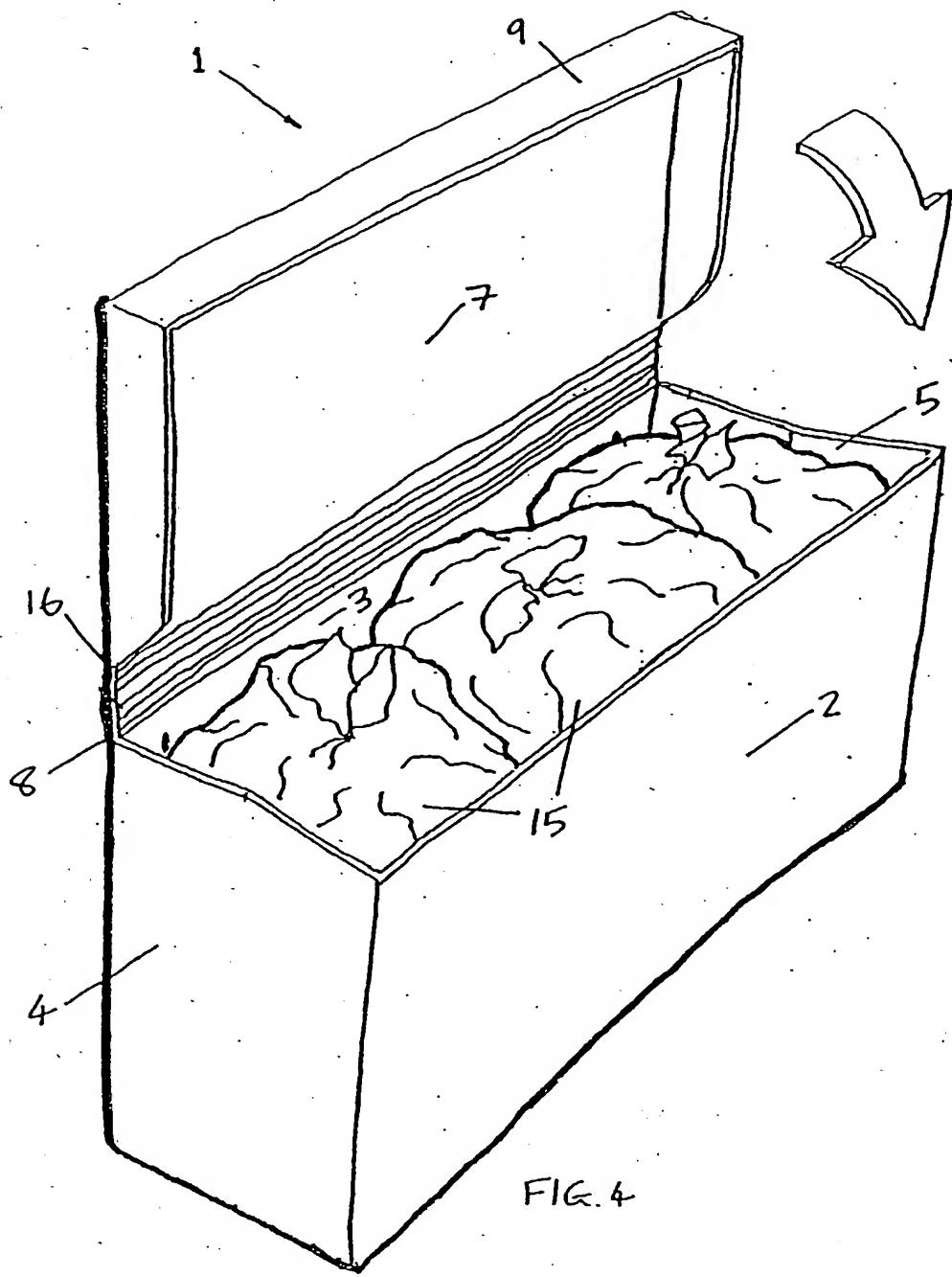


FIG. 4

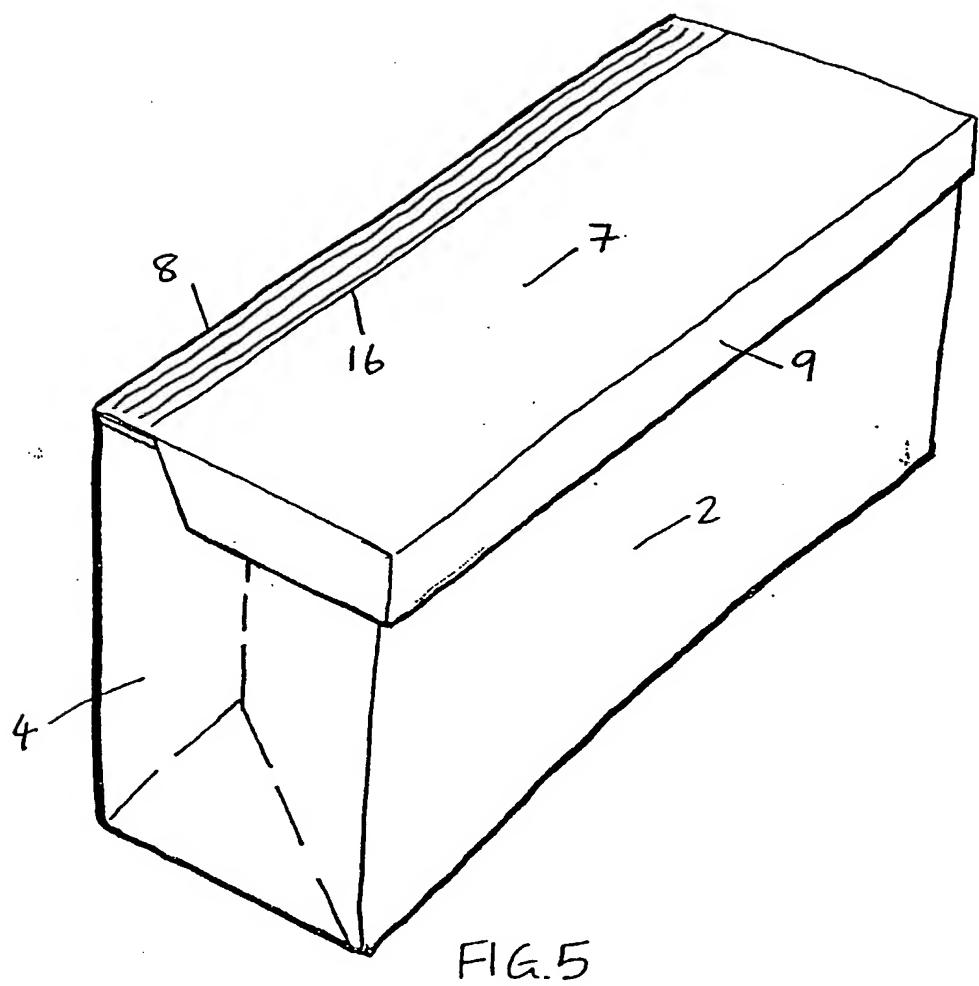
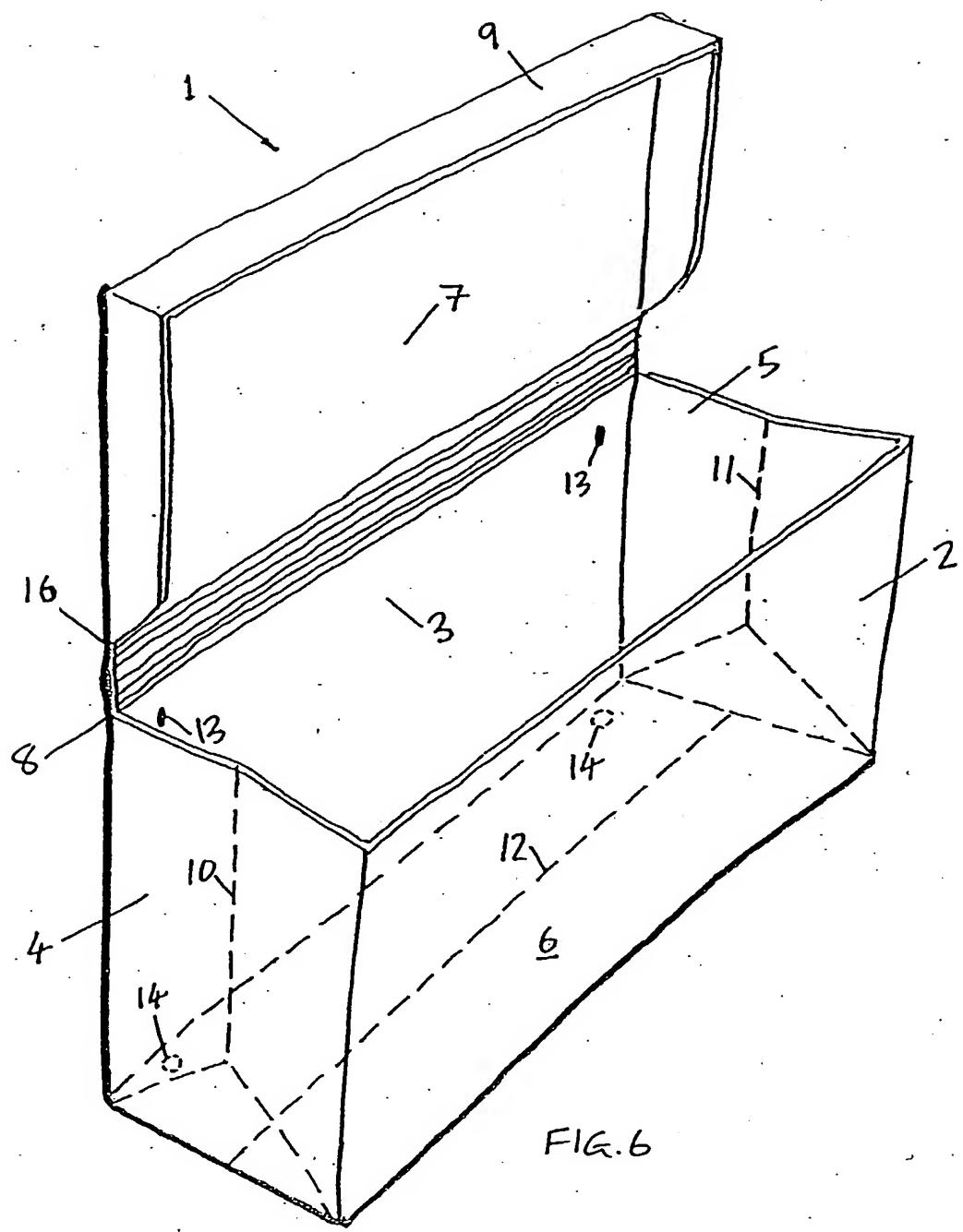


FIG. 5



COLLAPSABLE CONTAINERS

5 The present invention relates to collapsable containers, and in particular but not exclusively to collapsable containers which may be used to store refuse sacks filled with domestic waste prior to their collection by refuse collectors.

10 Containers which store refuse sacks prior to collection by a refuse collector are well known. They are generally of a very simple construction and typically comprise a metal or plastic open-topped container sized to store several filled refuse sacks and
15 provided with a lid which is either detachable from the container or hinged to the container.

20 Such known refuse containers are usually situated in close proximity to a domestic residence, for example adjacent a back door or at least in a place where they are easily accessed from the residence, so that filled refuse sacks can be easily transferred from the residence to the refuse container. It is normal for domestic waste to be collected on a regular basis, say once per week, and the night before collection is due
25 the refuse container must be moved from its location close to the residence to the roadside so it can be emptied the next day by a refuse collector.

30 This procedure, however, can be inconvenient and impractical and known refuse containers suffer from a number of problems. Firstly, these refuse containers tend to be bulky and occupy a significant amount of space whether they are filled with refuse sacks or not. Many properties do not have sufficient space to store this type of container so the container remains
35 permanently by the roadside where it is an obstacle for pedestrians walking passed the residence. If sufficient space is available to locate the refuse container on the home owner's property, the container may still prove to be an obstacle by blocking the pathways and driveways

used by the residents of the property and perhaps blocking access to the property itself.

In addition to problems caused by the amount of space that these containers occupy, problems exist in transporting the containers from the residence to the roadside prior to collection of the refuse sacks. Many plastic containers are provided with wheels so that the container can be more easily moved to the roadside prior to collection. The provision of wheeled containers has addressed this problem to some extent however wheeled containers can still be awkward and difficult to move due to the size and weight of refuse containers when filled.

Further problems exist since many known refuse containers are free standing and are susceptible to being overturned. In particular, they can be overturned by dogs, other animals, vandals and so on.

For the reasons above it is sometimes the case that known refuse sack containers cannot be used or are considered by the home owner to be too impractical or inconvenient. This leads to unprotected filled refuse sacks being placed on the home owner's property or at the roadside. Unprotected refuse sacks tend to attract dogs, cats and other animals and often the refuse sacks are torn by these animals which allows the waste contained within to spill and spread over the home owner's property or over the roadside. Not only is this visually unattractive but it also may be a risk to health. Waste material once scattered in this way is also difficult and expensive to collect and dispose of.

What is needed therefore is a container for filled refuse sacks which addresses problems of known refuse containers. In particular, a refuse container is needed which efficiently utilises the space it occupies, which is not required to be moved once filled with refuse sacks, which allows refuse sacks to be protected from animals and which is not easily overturned.

From a first aspect, the present invention provides a weatherproof refuse sack container comprising a generally box-like structure formed from a front panel, a rear panel, a bottom panel, two side panels, and a lid, said panels and said lid being hingedly connected together, said side panels and said bottom panel being collapsable so that the container is collapsable from an expanded condition in which the front panel and rear panels are spaced apart a first distance and in which it can receive refuse sacks to a collapsed condition in which the front and rear panels are spaced apart by a smaller distance, and in which the lid hinges down over the front panel.

Thus, in accordance with the invention, when not required to store refuse sacks the container can be collapsed so that it occupies far less space and is less likely to cause an obstruction.

The container may be of any suitable dimensions and is preferably sized to receive several filled refuse sacks at a time. Preferably, the container takes the form of a horizontally elongated box whereby it may receive a number of refuse sacks side by side.

The two sides panels are preferably rectangular in shape when fully expanded, thus giving the container a rectangular transverse cross-section, so that the front and rear panels lie parallel to one another in the expanded condition of the container. The front panel and rear panel are also preferably rectangular such that in the expanded condition the container is generally cuboid in shape.

The lid is preferably sized to generally cover the open top of the container when fully expanded. Preferably the lid is provided with a lip extending around three sides i.e. along the exposed edges of the lid, whereby in use, with the container expanded and with the lid shut, the lip extends downwardly from the lid for a short distance along each side wall and the

front panel. The lip ensures that the lid is correctly positioned when in its closed position and assists in maintaining the correct shape of the container. The lip also inhibits entry of rain water into the interior of the container.

To prevent rainwater collecting on the lid and to further inhibit entry of rain water into the container, the lid may be adapted to shed rain water say by sloping the lid from the rear towards the front.

Means are preferably provided to retain the lid in its closed position when the container is expanded to prevent the lid from being blown by the wind and to prevent animals from gaining access to the interior of the container. For example, a releasable fastening, such as Velcro®, may be suitably arranged between the lid and one or more container panels.

When expanded the contents of the container may help to maintain the container in its expanded condition. Alternatively or additionally other means may be provided to maintain the container in its expanded condition. Preferably such means act to maintain the front panel in its fully extended position away from the rear panel. For example, a spacer element or elements could be used to maintain the distance between the front and rear panels. Alternatively, a stiffener element or elements could be used to keep the side panels in a flat, fully expanded condition. Other means may also be suitable.

The container is preferably attached to a secure structure such as a wall, fence or railings. This attachment provides support for the container when in its collapsed condition. Attachment to a supporting structure also reduces the chance of the container being overturned and discourages individuals from moving the container without the owner's permission. Preferably the rear panel of the container is attached to said structure. Thus when attached to say a fence the

container can be expanded when required to hold refuse sacks then collapsed but left in place when empty. Of course, if not required, the container can be detached from its supporting structure, collapsed and stored.

5 The attachment of the container may be achieved in many ways, for example holes may be provided in the rear panel so the container can be tied to a suitable object. In one preferred form of attachment, the rear panel is formed with two spaced apart reinforced holes located
10 towards the top edge of the rear panel. Two hooks can then be located say on a fence or wall over which the two holes can be placed to secure the container in position. Once the hooks have been positioned on a structure they preferably remain there permanently to be
15 re-used whenever required.

An alternative preferred form of attachment also involves providing holes in the rear panel but instead of using hooks, the fence, wall or whatever is provided with elements which can pass through each hole and can
20 be rotated or otherwise manipulated so that they cannot pass back through the hole thus securing the container. One such suitable element could comprise a rotatable elongate member which can pass though a hole in one orientation and then be rotated so that it cannot pass
25 back through the hole in a similar manner to the attachment mechanism of a cuff link.

With the container attached to a supporting structure, the front panel can be easily pulled away from the rear panel to expand the container so it can be
30 filled with refuse sacks.

As stated above, when not required to store refuse sacks the container is collapsed so that the front panel is in close proximity to the rear panel and the lid of the container folds over the front panel. Preferably
35 the lid is sized to cover the front panel in this position. With the lid folded over the front panel the lip formed around the perimeter of the lid extends from

the lid towards the rear panel thus the collapsed container has the appearance of a closed flat box.

To facilitate a neat arrangement of the lid when folded over the front panel, the lid may be formed with an additional intermediate hinge line. This may be spaced from the rear panel by a distance corresponding generally to the collapsed depth of the container.

The side panels and bottom panel are collapsible and this may be achieved by any suitable means. For example, these panels may be made of collapsible material such as netting or the like, but preferably the side panels and the bottom panel are formed from a sheet material provided with hinge lines to allow the panels to concertina from an expanded to a collapsed condition. Accordingly predetermined hinge lines are provided on the side panels and bottom panel so that these panels fold in a predictable and repeatable manner, most preferably towards the interior of the container. Such hinge lines may be produced by weakening the panel in some way along the desired hinge line.

As will be apparent, there are various arrangements of hinge lines on the side panels and bottom panel which would allow the container to collapse. In one suitable arrangement each of the side panels may be provided with a central vertical hinge line which extends the height of the panel, and the bottom panel is then provided with a hinge line which extends longitudinally along the centre of the bottom panel, and gusset hinge lines extending from end regions thereof. During collapsing of the container, each side panel folds inwardly about its vertical hinge line, while the centre of the bottom panel folds inwardly about its hinge line and the triangular gusset portions defined at each end of the bottom panel by the gusset hinges fold to accommodate the inwardly folding side panels.

As stated above, other folding mechanisms are known which may be equally suitable. For example, the hinge

line formed on the bottom panel may extend the entire length of the bottom panel whilst the hinge lines on each side panel may define a triangular gusset portion adjacent the bottom panel.

5 When in the collapsed condition, means are preferably provided to maintain the container in this condition. For example, a releasable fastener may be arranged between one or more panels of the container. Alternatively the lid may hold the container collapsed,
10 either by its own weight, or means may be provided to hold the lid in place when the container is collapsed. Again such means could comprise a releasable fastening such as Velcro® suitably arranged between the lid and an appropriate panel or panels.

15 Preferably the panels of the container are made from a relatively rigid material such as plastics. This allows the container to be self-supporting, so that it can be freestanding without any additional support. If required, the side panels and bottom panel may be
20 constructed using a different material to that used for the front panel, rear panel and lid but it is preferred that the side panels and lid of the container are constructed from the same material. One suitable and preferred material is plastic since it is light,
25 weatherproof, easily cleaned and can be sufficiently flexible to allow the side panels and bottom panel to collapse. A container constructed of plastic can also be easily coloured either to provide an aesthetic appearance or to minimise the visual impact of the
30 container.

It will be apparent that it is possible to construct the entire container, i.e. all the five panels and the lid, from a single sheet of material which can be cut and folded to provide the required box-like shape. A single sheet construction method provides an easy and low cost form of manufacture. During construction, where necessary adjacent panels can be

connected together by any suitable means such as the provision of tabs on one panel which can be fixed to an adjacent panel say by gluing, heat welding or the like.

It is preferred that holes are provided in the bottom panel of the container to allow water to drain from the container. This is done to facilitate washing of the container and to allow any rain water that enters the container to drain away.

The front panel is preferably provided with one or more handles which, when expanding the container, can be used to pull the front panel away from the rear panel thus forcing the side panels and the bottom panel to unfold.

The present invention whilst providing a convenient way of storing general refuse prior to collection is also well suited to storing sorted waste material prior to recycling of this waste material. As the container is preferably horizontally elongated, refuse sacks will generally sit side by side thus allowing each refuse sack to be seen and the type of refuse within each sack to be identified both by the home owner and by the refuse collector. Furthermore, the container of the present invention can be compartmentalised, say by the provision of markings on the interior faces of the panels or by the provision of collapsible structural separating members such as internal walls. Thus for example three compartments could be provided, one for plastic waste, one for glass and one for general waste. Each type of waste can therefore be easily identified for recycling or disposal. To facilitate identification of the type of waste held within each compartment the underside of the lid could be provided with means which indicate the contents of each compartment.

Although the container of the present invention is primarily intended to store refuse sacks prior to their collection, it will be evident that the container may advantageously be used to store other articles. For

example, the container may be used within the home to store household articles such as clothes, bedding and so on.

Therefore, from a further aspect, the present invention provides a container comprising a generally box-like structure formed from a front panel, a rear panel, a bottom panel, two side panels, and a lid, said panels and said lid being hingedly connected together, said side panels and said bottom panel being collapsible so that the container is collapsible from an expanded condition in which the front panel and rear panels are spaced apart a first distance and in which the container can receive articles to be stored, to a collapsed condition in which the front and rear panels are spaced apart by a smaller distance, wherein in the expanded condition the lid substantially covers the container and engages the panels to maintain the shape of the container and in the collapsed condition the lid hinges down over the front panel.

The container of this aspect may be provided with any of the features mentioned above, and in particular it is preferred that the lid is formed with a lip as described which can serve to maintain the container's expanded shape. As an alternative to providing a lip, the underside of the lid may be provided with one or more grooves which, with the lid closed, receive the upper edges of the panels to maintain the shape of the container.

The present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 illustrates a preferred form of the present invention showing a container in its expanded condition.

Figure 2 illustrates the container of figure 1 in its collapsed condition.

Figure 3 illustrates the container shown in figures

1 and 2 with its lid raised prior to expansion.

Figure 4 illustrates the container in use when filled with a number of refuse sacks.

5 Figure 5 illustrates the container shown in figure 4 with its lid closed.

Figure 6 illustrates a container with an alternative arrangement of hinge lines.

10 Figure 1 shows a preferred form of container in accordance with the invention comprising a front panel 2, a rear panel 3, a first side panel 4, a second panel 5, a base panel 6 and a lid 7. The container is illustrated in its expanded condition with the front panel 2 fully extended away from the rear panel 3. In this condition each of the panels comprises a generally planar element. The panels and lid are formed from a single sheet of material, say plastic, which is cut and folded to provide the required box-like shape with adjacent panels being attached together where required. The use of plastic is preferred as it is durable, easily cleaned and waterproof. The lid 7 extends from the rear panel 3 and includes a hinge line 8 formed between the lid 7 and the rear panel 3 which allows the lid 7 to pivot with respect to the rear panel 3.

20 Figure 1 also illustrates a suitable arrangement of hinge lines which allow the container to be expanded and collapsed. As shown, each side panel 4,5 possesses a hinge line 10,11 which extends vertically for the height of the panel and is located half way along the length of the panel. The bottom panel 6 is formed with a hinge line 12 which runs longitudinally along the centre of the bottom panel 6 but splits at either end to extend towards each corner of the bottom panel 6 thus defining triangular gusset portions at each end of the bottom panel 6.

30 When the container is collapsed from the position shown in this figure, the side panels 4,5 fold along their respective hinge lines 10,11 such that the hinge

lines 10,11 move inwardly towards each other. At the same time, the central portion of hinge line 12 moves upwardly and the triangular gusset portions of the base panel fold around the inwardly extending side panels.
5 The front panel 2 and rear panel 3 are thus able to move towards each other until the container is in its collapsed condition.

The container is provided with fixing holes 13 which are situated towards the upper edge of the rear 10 panel 3 and adjacent each side panel 4,5. The fixing holes 13 allow the container to be secured to a permanent structure such as a wall, fence or the like to support the container in its collapsed condition.

15 The bottom panel 6 of the container is formed with two drainage holes 14. The drainage holes 14 allow water to drain from the interior of the container say when the container is being washed or if unwanted rain water enters the container.

20 As described above, when not in use the container is collapsed so that it occupies less space and allows it to be easily stored if required.

Figure 2 illustrates the container in its fully collapsed condition with lid 7, front panel 2 and rear panel 3 parallel and in close proximity to each other.
25 This figure shows how the lid 7 folds over the front panel 2 so that the lip 9 of the lid 7 serves to form a generally enclosed flat box suitable for easy storage. The lid 7 is formed with an intermediate hinge line 16. This intermediate hinge line 16 is spaced for the rear 30 panel 3 by a distance approximately equal to the depth of the collapsed container to provide the collapsed container with a neat appearance.

Figure 3 illustrates the collapsed container of figure 2 but with its lid 7 open so that the container can be expanded. Handles (not shown) are provided on the front panel 2 so that the front panel 2 can be pulled away from the rear panel 3 to expand the
35

container.

Figure 4 illustrates the container when filled with three refuse sacks 15. When the container has been filled with refuse sacks the lid 7 would normally be 5 closed to cover the refuse sacks and prevent rain water from entering the container.

Figure 5 shows the filled container with its lid closed. The lid 7 is provided with means (not shown) to releasably attach the lid 7 to the front panel 2 so as 10 to prevent the lid 7 from being blown in the wind and to prevent animals from accessing the refuse sacks.

The lid 7 is provided around its periphery with a lip 9 which, when the lid is closed, extends vertically downwards from the lid 7 and provides a more secure 15 sealing of the container.

Figure 6 illustrates a container with an alternative arrangement of hinge lines. As can be seen, bottom panel 6 is provided with a single hinge line 12 which runs centrally along the entire length of the 20 bottom panel 6. Each side panel 4,5 is formed with a centrally located vertically extending hinge line 10,11 and a gusset hinge located towards the bottom of each 25 side panel 4,5. Again when collapsing the container the front panel 2 is pushed towards the rear panel 3 and the hinge lines 10,11 and 12 move inwardly. However, in this arrangement the triangular gusset hinges fold around the upwardly extending hinge line 12 of the bottom panel 6.

Although the present invention has been described 30 with reference to preferred embodiments, it will be understood by those skilled in the art that various changes in form and detail may be made without departing from the scope of the invention as set forth in the accompanying claims.

Claims

1. A weatherproof refuse sack container comprising a generally box-like structure formed from a front panel, 5 a rear panel, a bottom panel, two side panels, and a lid, said panels and said lid being hingedly connected together, said side panels and said bottom panel being collapsible so that the container is collapsible from an expanded condition in which the front panel and rear 10 panels are spaced apart a first distance and in which it can receive refuse sacks, to a collapsed condition in which the front and rear panels are spaced apart by a smaller distance, and in which the lid hinges down over the front panel.
- 15 2. A container comprising a generally box-like structure formed from a front panel, a rear panel, a bottom panel, two side panels, and a lid, said panels and said lid being hingedly connected together, said side panels and said bottom panel being collapsible so that the container is collapsible from an expanded 20 condition in which the front panel and rear panels are spaced apart a first distance and in which the container can receive articles to be stored, to a collapsed condition in which the front and rear panels are spaced apart by a smaller distance, wherein in the expanded 25 condition the lid substantially covers the container and engages the panels to maintain the shape of the container, and in the collapsed condition the lid hinges down over the front panel.
- 30 3. The container of claims 1 or 2, wherein the two side panels are generally rectangular in shape when fully expanded, thus giving the container a rectangular 35 transverse cross-section, so that the front and rear panels lie parallel to one another in the expanded condition of the container.

4. The container of claim 3, wherein the front panel and rear panel are generally rectangular such that in the expanded condition the container is generally cuboid in shape.

5

5. The container of any preceding claim, wherein the lid is generally sized to cover the open top of the container when fully expanded.

10

6. The container of any preceding claim, wherein the lid is provided with a lip extending around three sides whereby, with the container expanded and with the lid shut, the lip extends downwardly from the lid for a short distance along each side wall and the front panel.

15

7. The container of any preceding claim, wherein means are provided to retain the lid in its closed position when the container is expanded.

20

8. The container of claim 7, wherein the means to retain the lid comprise a releasable fastening, such as Velcro®, suitably arranged between the lid and one or more container panels.

25

9. The container of any preceding claim, wherein means are provided to maintain the container in its expanded condition.

30

10. The container of claim 9, wherein the means to maintain the container in its expanded condition act to maintain the front panel in its fully extended position away from the rear panel.

35

11. The container of claim 10, wherein the means to maintain the container in its expanded condition comprise one or more spacer elements to maintain the distance between the front and rear panels.

12. The container of claim 10, wherein the means to maintain the container in its expanded comprise one or more stiffener elements to keep the side panels in a flat, fully expanded condition.

5

13. The container of any preceding claim, wherein the container includes attachment means to attach the container to a secure structure, such as a wall, fence or railings.

10

14. The container of claim 13, wherein the attachment means is attached to the rear panel of the container such that the container can be expanded when required for use or collapsed but left in place when not required.

15

15. The container of claim 14, wherein the attachment means comprise holes provided in the rear panel of the container such that the container can be tied to a structure, or alternatively the holes can be attached over hooks located on the structure, or alternatively the hole can be passed over elements fixed to the structure which can pass through the holes in one direction but cannot pass back through the holes in the other direction, i.e. in a similar manner to the attachment mechanism of a cuff link.

20

16. The container of any preceding claim, wherein, when the container is collapsed, the front panel is in close proximity to the rear panel and the lid of the container folds over the front panel.

25

17. The container of claim 16, wherein with the lid folded over the front panel, the lid is sized to cover the front panel.

30

18. The container of any preceding claim, wherein the

lid is formed with an additional intermediate hinge line to facilitate a neat arrangement of the lid when folded over the front panel.

5 19. The container of claim 18, wherein the intermediate hinge line is spaced from the rear panel by a distance corresponding generally to the collapsed depth of the container.

10 20. The container of any preceding claim, wherein the side panels and bottom panel are made of collapsable material, such as netting or the like.

15 21. The container of any of claims 1 to 19, wherein the side panels and the bottom panel are formed from sheet material provided with hinge lines to allow the panels to concertina from an expanded to a collapsed condition.

20 22. The container of claim 21, wherein the side panels and bottom panel are configured to collapse by folding towards the interior of the container.

25 23. The container of claim 22, wherein each of the side panels is provided with a central vertical hinge line which extends the height of the panel, and the bottom panel is then provided with a hinge line which extends longitudinally along the centre of the bottom panel, and gusset hinge lines extending from end regions thereof.

30 24. The container of claim 22, wherein the bottom panel is provided with a hinge line which extends the length of the bottom panel, and each side panel is provided with hinge lines which define gusset portions adjacent the bottom panel.

35 25. The container of any preceding claim, wherein means are provided to maintain the container in the collapsed

condition.

26. The container of claim 25, wherein the means to maintain the container in the collapsed condition 5 comprise a releasable fastener arranged between one or more panels of the container.

27. The container of claim 25, wherein the means to maintain the container in the collapsed condition 10 comprise a releasable fastening which holds the lid in place when the container is collapsed.

28. The container of any preceding claim, wherein the panels of the container are made from a rigid material 15 such that the container is self-supporting.

29. The container of any preceding claim, wherein the panels are formed from several separate sheets of material.

20 30. The container of any of claims 1 to 28, wherein the panels are formed from a single sheet of material which is cut and folded to provide the required box-like shape.

25 31. The container of any preceding claim, wherein holes are provided in the bottom panel of the container to allow water to drain from the container.

30 32. The container of any preceding claim, wherein the front panel is provided with one or more handles which, when expanding the container, can be used to pull the front panel away from the rear panel.

35 33. The container of any preceding claim, wherein the container is compartmentalised, say by the provision of markings on the interior faces of the panels or by the

provision of collapsable structural separating members,
such as internal walls.

34. A container substantially as herein described with
5 reference to the accompanying figures.



Application No: GB 0023553.1
Claims searched: 1 to 34

19

Examiner: Mike Henderson
Date of search: 23 January 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.T): A4A (AE) B8P (PC3B PC3C PC3D PC3X PK9 PK12)
Int Cl (Ed.7): B65D 1/22 19/12 19/16 B65F 1/00 1/06 1/08
Other: ONLINE:EPI,EPODOC,JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2307847A1	(CAMPBELL) (Embodiment of Fig.5 particularly relevant)	1 to 7,9 to 14,16,17,20 to 22,25 & 28 to 31
X	US 5725310	(KRUCZKO) (Whole disclosure relevant)	1 to 5,7 to 10,13,14,16, 18,20 to 24,28 & 30
X	US 5299704	(THORBY) (Whole disclosure relevant)	1 to 6,16,17,21, 22,25,28 & 29
X	US 4402452	(KUPERSMIT) (Whole disclosure relevant)	1 to 5,7 to 10,16,17, 20,21,25,28 & 30
X	JP 11116001A	(SWAN MOVING WALL KK) (Figs 1 to 4 particularly relevant)	1 to 5,13 to 16,21,22,28 & 29
X	JP 10203601A	(KURATA FUMIO) (Figs 1 to 3 particularly relevant)	1 to 5,16,17 & 28

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.